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Climate Neutrality of the Economy

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EU POLICY ON THE DEVELOPMENT OF RENEWABLE ENERGY SOURCES: ENERGY SECURITY ISSUES

Abstract

The article examines the European Union's policy framework concerning the advancement of renewable energy sources. The study's findings indicate that increasing the share of renewable energy sources in the structure of energy consumption contributes to the reduction of greenhouse gas emissions, promotes sustainable economic development, ensures energy security, and reduces dependence on imported fossil energy resources. The paper employs a mixed-

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methods approach, combining qualitative and quantitative analyses of regulations, economic indicators, and statistical data. The study demonstrates that investments in renewable energy within the European Union serve as a pivotal indicator of the sector's development. The analysis reveals a substantial impact of energy efficiency subsidies, natural gas and electricity prices, and the share of renewable energy in the overall EU energy balance on the development of renewable energy sources. The study shows that the main instruments for stimulating the development of renewable energy sources in the EU are state subsidies, research and innovation funding, and the introduction of a system of auctions and guarantees of the origin of energy from renewable sources, which allows to create stable conditions for investors and expand the use of clean energy sources in the EU.

Key Words:

energy security, EU, green energy, renewable energy sources, subsidies.

JEL: Q42; Q48; F53; O13.

1 figure, 1 formula, 4 tables, 26 references.

Problem Statement

Given the current stage of development of the global economy and the growing challenges associated with climate change, the issue of transition to the use of renewable energy sources (RES) is becoming extremely relevant. The European Union, a global leader in the effort to combat climate change, has implemented an ambitious policy aimed at decarbonizing the energy sector and promoting the use of RES. The augmentation of the share of RES in the overall energy consumption structure is instrumental in achieving a multifaceted agenda, including the mitigation of greenhouse gas emissions, the enhancement of energy security, the reduction of reliance on imported fossil energy resources, and the promotion of sustainable economic development.

The relevance of the research topic is due to a number of factors. Firstly, energy crises caused by geopolitical conflicts, in particular the war in Ukraine, are exacerbating energy security issues, forcing EU countries to seek alternative energy sources. Secondly, the imperative to address climate change and adhere to the Paris Climate Agreement presents a substantial challenge to the EU, necessitating comprehensive transformation within the energy sector. The persistent rise in energy prices, particularly that of natural gas and oil, has prompted a search for more affordable and reliable energy sources, requiring substantial investments in renewable energy.

The aim of the article is to analyze the EU's policy on the development of renewable energy sources. The analysis allows for understanding the effectiveness of existing measures, assessment of the contribution of RES to reducing energy dependence and carbon footprint, and identification of potential challenges to achieving the EU's climate goals for 2030 and 2050.

Literature Review

In the context of research on the development of renewable energy sources, some authors (Ivaniuta et al., 2020; Ivaniuta & Yakushenko, 2022) have examined the adaptation of Ukraine's climate policy to the standards of the European Green Deal, with a particular focus on decarbonization and energy efficiency. Kytsiuk (2023) assesses the ramifications of this trajectory on EU business and industry, in addition to the obstacles inherent in the implementation of novel environmental standards. Galbiati Stella (2024) and Rokhmawati (2021) demonstrate that an augmentation in green investment exerts a favorable influence on the reduction of greenhouse gas emissions. In the article by Kiesecker et al. (2024), the authors study land conflicts in the development of wind and solar power plants in Europe, while other researchers (Stainforth et al., 2021) pay attention to the socio-economic impacts of RES, such as the impact on employment and economic growth. Belaïd (2022) explores the problem of energy poverty caused by ineffective climate policies, while Doukas & Nikas (2022) analyze the EU energy crisis and the need to adapt to new conditions.

In a series of papers (Borysiak et al., 2024; Dluhopolskyi et al., 2023; Borysiak et al., 2022), the authors explore the areas of low-carbon management in the selection of resources for energy production at enterprises, as well as assess the readiness of households to use low-carbon technologies by switching to renewable energy consumption. The research conducted by Shen et al. (2024) has established a close link between the level of renewable energy production and carbon emissions.

However, the impact of investments and subsidies on the development of renewable energy in the EU, as well as their contribution to achieving climate goals by 2030, remains to be thoroughly examined. This requires a comprehensive analysis of EU policy measures aimed at stimulating renewable energy and their impact on energy security and decarbonization.

Methodology

The study employs a mixed-methods approach, integrating qualitative and quantitative analyses of legislation, economic indicators, and statistics on the development of renewable energy in the European Union. The analysis draws upon a range of official sources, including regulations, reports, and strategic documents from the European Commission; statistics on the share of RES, investments, and energy prices from Eurostat; reports on global RES development from international organizations IEA, IRENA, and REN21; articles in peer-reviewed journals on RES policy in the EU; and national strategic documents from EU member states. The article provides a content analysis of the main EU directives, quantitative analysis of statistical data, comparative analysis (trends in the development of RES in the EU countries with a comparison of regional characteristics).

Research Results

The European Union initiated the systematic development of a comprehensive renewable energy policy during the 1990s, a pivotal period marked by the recognition that a substantial reliance on fossil energy sources, including coal, oil, and gas, was contributing to a considerable surge in greenhouse gas emissions, thereby exerting a significant impact on the global climate. The advent of systemic policy is marked by the adoption of the inaugural Renewable Energy Directive (RED) in 2001, which established targets for EU member states to augment the share of renewable energy in their respective energy balances. This development signaled the commencement of initiatives designed to promote the growth of green energy sources (Borysiak et al., 2022).

In order to develop a comprehensive understanding of the regulatory framework governing the development of renewable energy in the European Union, it is necessary to examine the primary regulatory documents that have been developed for this purpose.

The Renewable Energy Directive (RED) is a pivotal legislative instrument of the European Union that aims to foster the development of renewable energy

sources and to limit reliance on fossil fuels (European Parliament & Council of the European Union, 2018). The initial adoption of this document occurred in 2001, and its subsequent updated version, RED II, came into effect in 2018. RED II establishes a minimum target of 42.5% for the share of renewables in total energy consumption by 2030. Additionally, it obliges EU member states to periodically assess and adjust their respective national legislation to facilitate the development of renewable energy sources.

A key element of this directive is the promotion of renewable energy utilization across various sectors, including electricity, heating, cooling, and transportation. Specifically, within the transport sector, the RED II establishes an objective of ensuring that a minimum of 14% of the energy consumed is derived from renewable sources. This initiative entails the proactive integration of biofuels, electric vehicles, and other advanced solutions with the objective of mitigating greenhouse gas emissions and ensuring energy security.

According to Directive (EU) 2018/2001, the primary incentive mechanisms established in RED II are as follows:

- Subsidies and financial support: Member States must provide national support mechanisms for companies that invest in renewable energy. These mechanisms include direct subsidies, grants, and other financial assistance.
- Feed-in tariffs and auctions: Member states may use auctions to support renewable energy projects, allowing them to attract competitive bids for financing large projects.
- Guarantees of origin of energy from renewable sources: Certification systems provide transparency and confirmation that the energy used by consumers is produced from renewable sources.
- Investment in research and innovation: A huge portion of the EU budget is allocated to developing new renewable energy sources (RES) technologies, including researching ways to improve the efficiency of energy systems and developing smart grids and energy storage.

The European Green Deal is a strategic program that complements the Renewable Energy Directive (RED II) and establishes global measures to combat climate change (European Commission, 2019). The Green Deal aims to make the EU climate neutral by 2050, which requires the complete decarbonization of the energy sector. Its primary objective is to reduce greenhouse gas emissions by 55% by 2030 compared to 1990 levels. This will be achieved by significantly increasing the use of renewable energy sources and introducing energy-efficient technologies in energy production.

As part of the program, EU countries should stimulate investment in green energy, modernize energy infrastructure, expand renewable energy production, reduce dependence on fossil fuel imports, and introduce environmental standards for industry and transportation. The document pays much attention to financial support mechanisms, such as the Recovery and Resilience Fund (RRF), through which a huge portion of funds is directed to investments in renewable energy and sustainable development.

The EU Emissions Trading System (ETS) is one of the EU's main instruments for combating climate change and stimulating the transition to renewable energy sources (European Commission, 2005). Established in 2005, the ETS was the first and largest international greenhouse gas emissions trading system. The basic idea is that for every ton of CO_2 or equivalent gases emitted, companies must have a corresponding number of emission permits. If a company reduces its emissions, it can sell its excess permits to other companies on the market. This creates market incentives to invest in energy-efficient technologies and renewable energy sources because companies want to reduce their emissions and avoid buying additional allowances.

It is important to note that the ETS covers large industrial sectors, including power plants, steel mills, cement plants, and the aviation sector. The system is gradually expanding to include more sectors of the economy. The ETS helps reduce overall emissions across the EU by gradually reducing the number of emissions allowances each year. This contributes to the EU's goal of achieving climate neutrality by 2050.

The Recovery and Resilience Facility (RRF), another crucial EU financial instrument, is aimed at economic recovery after the pandemic, with a focus on green investments (European Commission, 2021). Since its establishment in 2021, the RRF has had a budget exceeding €670 billion, big part of which has been allocated to finance renewable energy projects. These projects include the construction of solar and wind power plants, the development of energy storage infrastructure, and the modernization of electricity supply networks. The fund also promotes modernizing industrial enterprises to improve energy efficiency, ultimately helping to reduce greenhouse gas emissions.

In addition to green energy investments, the RRF supports renewable energy sector research and innovation, enabling the development of innovative technologies that improve energy efficiency and reduce costs.

National Renewable Energy Action Plans (NREAPs) are key documents through which EU member states define their renewable energy strategies (European Commission, 2020). These plans include national renewable energy targets based on EU directives, such as the percentage of renewable energy used for electricity, heating, and transportation. Each country must prepare a plan that considers its geographical and economic characteristics and provides specific

measures to achieve its targets. These measures may include subsidies, tax incentives, or regulatory measures.

NREAPs also contain forecasts for the development of various renewable energy technologies, such as wind, solar, hydro, and bioenergy, and prioritize investments in these areas. Importantly, NREAPs are dynamic documents that can be revised based on changes in EU policy or national priorities.

In 2022, global investments in renewable energy sources reached a record USD 495.4 billion, 17.2% more than the previous year (REN21, 2023). The main factor behind this growth was the substantial increase in solar energy investment, accounting for 62% total in the renewable energy sector (RES). However, investments in wind energy decreased by 1.3% due to permitting difficulties and high material costs, which increased due to inflation.

The situation in the European renewable energy market appears to be more complicated. Despite EU governments strengthening their policies to support renewable energy in response to the war in Ukraine and the need to reduce dependence on Russian gas, investments in the sector decreased by 26% in 2022, reaching $55.9 billion. Rising inflation and uncertainty about government interventions in energy markets, including revenue caps for various technologies, were two of the main reasons for this decline.

The decline in EU investment in 2022 revealed the heterogeneity of renewable energy development among its member states. While investments increased by 53% in Italy and 36% in Spain, other countries, including France, Germany, and the United Kingdom, experienced substantial decreases. Investment volumes decreased by 35.6% in France, 32.8% in Germany, and 81.4% in the UK (REN21, 2023).

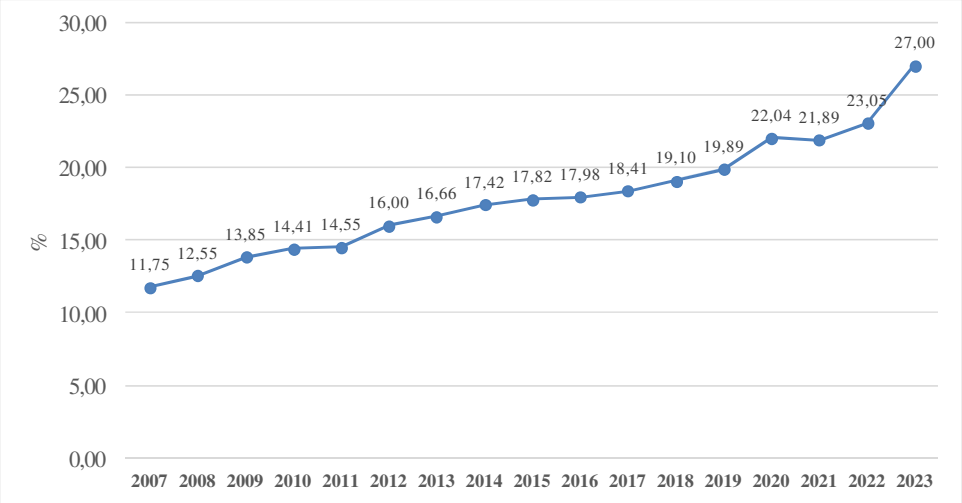
Despite these difficulties, the EU's RES policy has produced noteworthy results. Notably, the share of renewable energy in the overall energy balance increased from 11.75% in 2007 to 27% in 2023 (Figure 1). This progress demonstrates the effectiveness of support mechanisms such as the Renewable Energy Directive (RED II), which requires member states to reach a 42.5% renewable energy target by 2030.

The EU's strengthened renewable energy policy has created a more stable environment for investors by offering preferential tariffs, subsidies, and other financial incentives. The REPowerEU plan plays a vital role in accelerating investment in green energy by providing additional incentives and simplifying regulatory procedures for renewable energy sources (RES) projects.

Now, let us consider the factors that influence the share of energy produced from renewable sources in the EU's total energy production (Table 1).

Figure 1

Dynamics of the share of energy from renewable sources in total energy production in the EU, 2007-2023



Source: Eurostat (2024).

Table 1

Factors influencing the dynamics of the share of energy produced from renewable sources in the structure of EU's total energy production in 2007-2023

	Investments in renewable energy in the EU, billion euros	Natural gas price for residential consumers, euros per kWh	Electricity prices for residential consumers, euros per kWh	Energy inflation, %	Subsidies for energy efficiency	Imports of energy and energy resources to the EU, million euros
2007	88.36	0.06	0.19	3.18	4.20	1327.29
2008	116.32	0.07	0.21	11.01	3.00	1354.89
2009	106.25	0.06	0.21	-4.97	2.50	1267.51
2010	149.60	0.06	0.22	7.16	5.20	1304.73
2011	94.75	0.07	0.22	11.38	6.00	1286.96
2012	116.79	0.07	0.23	7.07	8.00	1279.51
2013	76.93	0.07	0.23	0.67	9.00	1270.23

	Investments in renewable energy in the EU, billion euros	Natural gas price for residential consumers, euros per kWh	Electricity prices for residential consumers, euros per kWh	Energy inflation, %	Subsidies for energy efficiency	Imports of energy and energy resources to the EU, million euros
2014	91.60	0.07	0.24	-1.62	11.00	1249.34
2015	67.89	0.07	0.24	-6.55	12.00	1310.06
2016	79.44	0.07	0.24	-4.45	14.00	1323.09
2017	55.17	0.07	0.25	4.60	15.00	1348.40
2018	71.53	0.07	0.28	6.30	16.00	1307.68
2019	65.62	0.07	0.26	1.34	16.00	1327.06
2020	91.59	0.07	0.27	-6.16	15.00	1171.79
2021	87.65	0.08	0.28	12.86	19.00	1224.29
2022	58.84	0.11	0.39	35.25	30.00	1300.49
2023	73.25	0.11	0.37	0.58	32.00	1300.49

Source: based on data from EU Monitor (2024), Eurostat (2024), Eurostat (2023), Eurostat (2022), Eurostat (2021), Eurostat (2020), Statista (2020).

The dynamics of energy production from renewable sources and its share in the EU's overall energy balance are determined by several factors, including the level of investment in renewable energy, natural gas and electricity prices for household consumers, energy inflation, energy efficiency subsidies, and the volume of energy imports to the EU.

Investments in the EU's renewable energy sector are a key indicator of its development. Investments amounted to 88.36 billion euros in 2007, increasing to 149.60 billion euros in 2010. This indicates an intensification of investment in renewable energy up to 2010, resulting from increased attention to reducing dependence on fossil energy sources. However, there has been instability in investment since then, possibly due to economic fluctuations and regulatory difficulties. For instance, investments dropped significantly to €58.84 billion in 2022 due to inflation and global crises.

The price of natural gas for household consumers also plays a key role. During the analyzed period, the gas price remained relatively stable until 2021, when it started to rise. In 2022, the price reached €0.11 per kWh, which is a significant jump compared to previous years. This increase is one of the factors that encouraged the EU to accelerate the development of renewable energy sources to reduce dependence on fossil fuels, especially in the context of declining gas imports from Russia.

Electricity prices for residential consumers increased from EUR 0.19 per kWh in 2007 to EUR 0.39 in 2022. Increasing electricity prices can have a dual effect: on the one hand, it can encourage consumers to switch to more energy efficient and renewable energy sources; on the other hand, it can become an additional burden for households and businesses, requiring government support in the form of subsidies.

Energy inflation is another principal factor. During the period 2007-2022, its fluctuations had a significant impact on the sector's economy. In 2009, there was a sharp drop in inflation to -4.97%, indicating a decline in energy costs. However, in 2022, inflation reached a peak of 35.25%, which significantly affected the economic conditions for the development of RES.

Energy efficiency subsidies have become a valuable tool for stimulating the development of renewable energy sources. In 2007, they amounted to €4.2 billion, while in 2022 this figure will increase to €30 billion. This proves that subsidy policies are actively used by EU countries to support investment and stimulate the transition to cleaner energy sources.

The volume of energy imports to the EU also varied during the period analyzed. In 2007, imports amounted to €1,327.29 million, peaking in 2017 at €1,348.40 million, but dropping to €1,171.79 million in 2020. This drop can be attributed to the COVID-19 pandemic, which has reduced energy demand. In 2022, the volume of imports recovered to €1,300.49 million, but in general, this figure shows that the EU is gradually reducing its dependence on imported energy.

For a deeper understanding of the impact of a range of factors on the share of renewable energy in the structure of EU energy production, it is advisable to conduct a correlation and regression analysis. This method allows us to assess which factors have the greatest impact on the dynamics of the share of renewable energy sources and to what extent. A regression model can be used to quantify the relationship between variables that affect the share of renewable energy, such as investments in renewable energy, natural gas and electricity prices, energy inflation, energy imports, and energy efficiency subsidies.

The correlation analysis will provide an opportunity to assess which factors are most strongly related to the dynamics of the share of renewable energy, and the regression model will allow us to quantify the impact of each of these factors. For example, based on the results of the preliminary analysis, we can expect that increased investment in renewable energy and increased energy efficiency subsidies will have a positive impact on the share of renewable energy, while rising energy prices may have a mixed impact, depending on the market structure and government policy.

Based on the data in Figure 1 and Table 1, let us build a correlation matrix to determine the factors influencing the dynamics of the share of energy from renewable sources in the structure of all energy produced in the EU (Table 2).

Table 2

Correlation matrix of factors influencing the dynamics of the share of energy from renewable sources in the structure of all energy produced in the EU

	Share of energy from renewable sources in the structure of energy production in the EU, % (Y)	Investments in renewable energy in the EU, billion euros (x_1)	Natural gas price for residential consumers, EUR per kWh (x_2)	Electricity prices for residential consumers, EUR per kWh (x_3)	Energy inflation, % (x_4)	Energy efficiency subsidies (x_5)	Imports of energy and energy resources to the EU, EUR million (x_6)
Share of energy from renewable sources in the structure of energy production in the EU, % (Y)	1						
Investments in renewable energy in the EU, billion euros (x_1)	-0.5514	1					
Natural gas price for residential consumers, EUR per kWh (x_2)	0.8003	-0.4366	1				
Electricity prices for residential consumers, EUR per kWh (x_3)	0.9080	-0.5271	0.9341	1			
Energy inflation, % (x_4)	0.1395	-0.0587	0.5111	0.4543	1		
Energy efficiency subsidies (x_5)	0.9485	-0.6252	0.8944	0.9702	0.3429	1	
Imports of energy and energy resources to the EU, EUR million (x_6)	-0.3181	-0.1401	-0.0474	-0.1324	0.1764	-0.0926	1

Source: calculated by the authors based on data from EU Monitor (2024), Eurostat (2024), Eurostat (2023), Eurostat (2022), Eurostat (2021), Eurostat (2020), Statista (2020).

The correlation matrix allows us to determine the strength and direction of the relationships between variables that may affect the share of renewable energy in the EU's overall energy balance:

1. The share of energy from renewable sources and investments in renewable energy. There is a significant negative correlation (-0.5514) between the share of renewable energy and investments in RES, which may indicate that an increase in the share of RES does not always directly correlate with an increase in investment in this sector. The negative correlation may be the result of the delayed effect of investments or various economic factors.

2. Share of RES and natural gas prices. The positive correlation (0.8003) between the share of renewables and the price of natural gas shows that as gas prices rise, the share of renewables also increases, which is quite logical, since the rising cost of fossil fuels stimulates the transition to renewable sources.

3. Share of RES and electricity prices. There is a strong positive correlation (0.9080), which indicates that as electricity prices for household consumers increase, the share of renewable energy increases, which is the result of increased demand for RES as an alternative to more expensive conventional electricity.

4. Share of RES and energy inflation. The correlation with energy inflation is quite weak (0.1395), which indicates that the impact of inflation on the share of RES is insignificant. This means that other factors, such as subsidies or government support, have a greater impact on the development of RES.

5. Share of RES and energy efficiency subsidies. The strong positive correlation (0.9485) between subsidies and the share of RES indicates that an increase in government subsidies is one of the key factors in the development of renewable energy. This indicator points to the importance of financial support in stimulating the transition to renewable sources.

6. Share of renewable energy sources and energy imports. The negative correlation (-0.3181) between the share of RES and energy imports indicates that an increase in the share of RES is accompanied by a decrease in the need to import fossil fuels, which reduces the EU's dependence on external suppliers.

Analysis of the correlation matrix revealed significant links between energy efficiency subsidies, natural gas and electricity prices, and the share of renewable energy in the EU's overall energy mix. This indicates that these factors obviously impact the development of renewable energy sources and require more detailed research. However, correlation analysis only shows the existence of a relationship between variables; it does not allow us to assess the strength or direction of this influence. To do so, we must build a regression model that quantifies the impact of each factor on the share of renewable energy (RES).

This model can help determine how much a change in variables, such as subsidies, investments, or energy prices, can affect the share of renewable energy in energy production. This information is crucial for evaluating the effectiveness of government programs and policies that aim to promote renewable energy development in the EU. The results of the regression analysis can optimize policies supporting renewable energy, helping the EU achieve its climate goals and promote green energy development.

Based on the data in Tables 3-4, the regression equation is constructed using only significant indicators:

$$Y = 32.99 - 0.0637x_4 + 0.5272x_5 - 0.0000161x_6, \quad (1)$$

Where x_4 – energy inflation, % (regression coefficient = *-0.0637*, P-value = *0.03*, which is a significant indicator); x_5 – energy efficiency subsidies, billion euros (regression coefficient = *0.5272*, P-value = *0.0015*, which is highly significant); x_6 – imports of energy and energy resources to the EU, billion euros (regression coefficient = *-0.0000161*, P-value = *0.006*, which is significant).

Thus, the main factors influencing the share of energy from renewable sources in the EU's overall energy balance are energy efficiency subsidies and energy imports. Both factors have significant P-values (less than 0.05), indicating their statistical importance to the model. In particular, energy efficiency subsidies have the greatest positive impact on the share of renewable energy sources (RES). This underscores the critical role of government support and financing in stimulating green energy development. Through subsidies, EU countries can reduce their dependence on fossil fuels and encourage investment in renewable energy sources.

Table 3

Regression statistics – 1

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.9890
R Square	0.9781
Adjusted R Square	0.9649
Standard Error	0.7544
Observations	17

Source: calculated by the authors.

Table 4

Regression statistics – 2

ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	6	254.0016	42.3336	74.3746	0.0000			
Residual	10	5.6919	0.5692					
Total	16	259.6935						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	32.9947	7.9675	4.1411	0.0020	15.2419	50.7474	15.2419	50.7474
Investment in renewable energy in the EU, billion euros	0.0112	0.0115	0.9796	0.3504	-0.0143	0.0368	-0.0143	0.0368
Natural gas prices for residential consumers, EUR per kWh	-21.1990	35.5736	-0.5959	0.5645	-100.4620	58.0640	-100.4620	58.0640
Electricity prices for residential consumers, EUR per kWh	-0.7297	21.6320	-0.0337	0.9738	-48.9288	47.4693	-48.9288	47.4693
Energy inflation, %.	-0.0637	0.0260	-2.4488	0.0343	-0.1217	-0.0057	-0.1217	-0.0057
Subsidies for energy efficiency	0.5272	0.1218	4.3272	0.0015	0.2557	0.7987	0.2557	0.7987
Imports of energy and energy resources to the EU, million euros	0.0000	0.0000	-3.3893	0.0069	0.0000	0.0000	0.0000	0.0000

Source: calculated by the authors.

However, energy imports negatively impact the share of renewable energy sources. This may happen because an increase in energy imports often means an increase in the supply of traditional energy sources, such as gas, oil, and coal. This, in turn, reduces the need for renewable energy development. It has become especially true in the context of energy crises related to foreign energy supplies.

Energy inflation has also proven to be a significant factor that negatively affects the share of renewables. An increase in general energy prices can lead to financial difficulties for new renewable energy project development due to in-

creased construction and operational costs, as well as rising material and technology costs. Thus, there is the need to control inflationary processes to ensure the sustainable development of renewable energy.

The modeling results confirm the necessity for improved government policies that stimulate renewable energy, particularly through subsidies and energy efficiency support. Since energy inflation negatively impacts the growth of renewable energy sources, it is crucial to develop policies that mitigate its effects and ensure stable development in the face of economic instability and rising energy prices.

Practical Applications and Limitations

To effectively develop renewable energy production in the EU, governments should continue and expand support programs, particularly energy efficiency subsidies. Modeling results showed that subsidies are the main factor positively affecting the share of renewable energy sources in the overall energy balance. Increasing government subsidies and grant programs for renewable energy projects would significantly reduce financial barriers for investors, especially during economic instability and high inflation.

Additionally, it is essential to strengthen measures to control energy imports because the growth of imports of traditional energy resources negatively impacts the development of renewable energy sources (RES). Reducing dependence on fossil fuel imports will stimulate demand for local renewable energy sources. This can be achieved by introducing quotas for the share of RES in each EU member state's domestic energy balance and by strengthening regulatory measures to reduce the share of fossil fuels in energy systems.

Due to the negative impact of energy inflation on renewable energy development, strategies must be developed to reduce the construction and maintenance costs of renewable energy facilities. This may include introducing innovative technologies and reducing the cost of materials for constructing «green» facilities. Additionally, stable pricing mechanisms that minimize inflation's impact on the energy sector and provide investors with predictability should be supported.

The EU should expand access to financing for renewable energy projects, particularly in regions with low levels of renewable energy penetration. Simplifying procedures for obtaining grants and concessional loans for these projects will boost investment in renewable energy. Furthermore, public-private partnerships in the renewable energy sector must be supported to mobilize additional investments and accelerate the development of modern technologies.

In general, to accelerate the development of renewable energy, the EU should continue to improve legislative initiatives to support renewable energy, in particular by introducing more ambitious targets under the European Green Deal. Coordinated efforts at the EU and national governments level will ensure stable and sustainable development of renewable energy in the face of energy and economic challenges.

Conclusions

The European Union's renewable energy policy has proven to be effective in increasing the share of renewable energy in the energy balance. The main support instruments are government subsidies, research and innovation funding, and the introduction of a system of auctions and guarantees for energy from renewable sources, which allows stable conditions for investors and the expansion of the use of clean energy sources in the EU.

One of the key success factors is energy efficiency subsidies, which have the strongest positive impact on the share of renewable energy sources. Increasing government support through subsidies allows EU countries to significantly reduce financial barriers for investors and stimulate the development of new renewable energy projects, which underscores the need to continue subsidy programs, especially in times of economic instability and high inflation.

Dependence on energy imports is a negative factor hindering the development of renewable energy. The results of the study show that increased imports of fossil fuels reduce the share of renewable energy. Reducing import dependence will help increase the EU's energy security and stimulate the transition to local RES.

Energy inflation is also a crucial factor that negatively affects the share of RES. Rising costs of construction and operation of energy facilities due to inflation may slow down the development of RES. This underlines the importance of controlling inflationary processes and introducing new innovative solutions that reduce the costs of implementing renewable energy projects.

Considering these factors, it is advisable to further develop financial support mechanisms, such as subsidies and grants, as well as to expand public-private partnerships in the RES sector, which in return will accelerate the transition to renewable energy sources and ensure the EU's energy independence and security in the future.

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